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Pokémon Go: Benefits, Costs, and Lessons for the Conservation Movement

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Abstract

Pokémon Go, an augmented reality (AR) smartphone game, replicates many aspects of real-world wildlife watching and natural history by allowing players to find, capture, and collect Pokémon, which are effectively virtual animals. In this article, we consider how the unprecedented success of Pokémon Go as a smartphone game might create opportunities and challenges for the conservation movement. By encouraging players to go outside and consider various aspects of virtual species' biology, the game could increase awareness and engagement with real-world nature. However, interacting with Pokémon could alternatively encourage exploitation of wildlife or replace players' desire to interact with real-world nature. We suggest a number of ways in which Pokémon Go could be adapted to increase its conservation impact, and how new conservation-orientated AR games could be created. We conclude that Pokémon Go sets a precedent for well-implemented AR games from which the conservation movement could borrow a number of ideas.

Introduction

On 6th July 2016, a San Francisco-based software company launched a large-scale citizen science project in New Zealand, Australia and the United States. Building on a series of scientific programmes started in Japan, the project aimed to improve our understanding of the distribution and abundance of over 150 species by having users enter data with a smartphone app. The launch was a huge success. In the first week there were an estimated 21 million active users in the United States (Allan 2016) and the project's app became the most downloaded in the Apple App Store's history (BBC 2016). Within days the app had surpassed Twitter in its number of daily active users (Allan 2016) and was beating Facebook, Twitter, Instagram and Snapchat in terms of daily user engagement times (Nelson 2016). Furthermore, anecdotal evidence suggested high levels of behavioural change amongst users, with people making significant adjustments to their daily routines and to the amount of time spent outside in order to increase encounter rates with the target species (Armanet 2016; Butcher 2016). Though this sounds like one of the most successful citizen science initiatives in history, it is, unfortunately, an illusion. The "citizen science" is part of the game "Pokémon Go" and while the user and usage statistics are real, the research is fictional and the species being studied are "Pokémon"—fictional creatures from a series of television programmes and games.

Developed by Niantic, a Google spin-off company, Pokémon Go is the latest output of the hugely successful Pokémon franchise. Using a smartphone's GPS together

Figure 1 Screenshots of gameplay showing the implementation of augmented reality. Panel A shows how the player's real-world location is displayed. The tall white and blue pillar and turquoise squares show the location of a gym, and Pokéstops, respectively. The darker land above the gym shows the location of an urban park where grass Pokémon are more likely to be found. A Pokémon, a Rattata, is to the right of the player. Panel B shows a Pokémon, a Zubat, superimposed into the real world about to be caught. Images courtesy of Niantic, Inc.

with Google Maps the game provides users with an augmented reality (AR) experience where they encounter, catch, and collect virtual species of Pokémon while exploring the real world (Figure 1). Once caught, species are catalogued (by being registered to a "Pokédex") and added to a player's personal collection. The game also designates sites of cultural interest, such as monuments or notable buildings as "gyms" (where players fight their Pokémon) or "Pokéstops" (where players collect items that help them catch and train Pokémon). As the game develops, players are able to "evolve" their Pokémon into more powerful forms and fight Pokémon belonging to other players.

Satoshi Tajiri, who designed the first Pokémon game in 1996, wanted to create a preindustrial play-world for urban children, one that replicated his childhood experiences of collecting insects and crayfish (Allison 2003). Many Pokémon are based on real species; Caterpie, for example, strongly resembles the caterpillar of Eastern Tiger Swallowtail (*Papilio glaucus*, Linnaeus 1758), while the famous Pikachu is based on a Pika (*Ochotonidae* sp.). Also, like real-world species, characters in Pokémon Go are linked to different environments and vary in abundance. In these respects, searching for and collecting Pokémon is a hugely popular, virtual replication of types of natural history observation, such as birdwatching.

In this article, we consider how the unprecedented success of Pokémon Go as a smartphone game might create opportunities and challenges for the conservation movement. Does its merger of virtual nature and the real environment offer an opportunity to use AR games to achieve conservation success? Or is this merely evidence of how little has changed since Balmford *et al.* (2002, p. 2367) concluded "conservationists are doing less well than the creators of Pokémon at inspiring interest in their subjects"? The potential for games to produce conservation outcomes has been explored previously (Sandbrook *et al.* 2015; Fletcher 2016a). However, with its novel use of AR, colossal popularity, and natural history parallels, Pokémon Go may represent a step-change in the potential relevance and impact of digital games for conservation. We begin by assessing the potential positive and negative impacts Pokémon Go could have for conservation. We then assess what lessons the conservation movement can take from the game, before concluding with recommendations for the future.

Pokémon Go as a conservation opportunity

As Satoshi Tajiri noticed during the 1990s, rapidly growing urban areas offer limited opportunities to connect directly with nature (Allison 2003). This reflects a widespread concern amongst conservationists that people, and particularly young people, have become disconnected from nature through urban living and are therefore less likely to value wildlife and wild places (Balmford *et al.* 2002; Balmford & Cowling 2006; Pergams & Zaradic 2006), a concept widely popularised as Nature Deficit Disorder (Louv 2005). Concern has also been expressed that interest in natural history is fading (Tewksbury *et al.* 2014) and that skilled natural historians and taxonomists are in increasingly short supply (Tancoigne & Dubois 2013). Two aspects of Pokémon Go in its current form have direct implications for addressing these urgent conservation problems.

First, and perhaps most obviously, the game encourages people to get outside. Successful players must explore new areas, visit a variety of environments, and cover lots of ground, preferably on foot. Special "eggs" that players collect, will only "hatch" after a player has walked a certain distance (2, 5, or 10 km), so there is a direct correlation between distance covered and success. There is growing evidence from social and traditional media indicating that Pokémon Go is already driving huge numbers of people outdoors and increasing the time they spend there (Armanet 2016; Butcher 2016). For example, there are reports of "hundreds if not thousands" of young people playing Pokémon Go at the National Mall and Memorial Parks in Washington, D.C., sites which

normally attract older generations (Carlton 2016). The location of specific Pokéstops and gyms can play an important role in motivating people to visit sites they might not otherwise be aware of (Butcher 2016; Streitfeld 2016). Though these are primarily sites that have no connection to natural history, many are in municipal parks, nature reserves, and national parks (Figure 1) (Carlton 2016; Zachos 2016).

Pokémon Go makes no explicit attempt to connect people to nonvirtual wildlife or conservation issues, and spending time outside does not always translate into engagement with nature. Nonetheless, there is evidence that people are discovering nonvirtual wildlife while playing Pokémon Go (Brulliard 2016). This type of experience is widespread and has led to the Twitter hashtag #Pokeblitz which helps people to identify "real" species found and photographed while playing (Brulliard 2016). Anecdotally, playing Pokemon Go has led the authors of this article to encounter a European Hedgehog (*Erinaceus europaeus*, Linnaeus 1758) and Tawny Owl (*Strix aluco*, Linnaeus 1758) in areas they had not previously seen them, and find a Madagascar Pond-heron (*Ardeola idae*, Hartlaub 1860) in the wild for the first time.

Second, Pokémon Go exposes users first hand to basic natural history concepts such as species habitat preferences and variations in abundance. Niantic has not released specifics as to how it assigns Pokémon to particular locations, but they do use a number of spatial environmental variables (local climate, vegetation type, distance to water, soil or rock type and land-use classifications such as zoos or parks) to place Pokémon in certain environments (Bogle 2016). For example, "grass Pokémon" tend to occur in parks while water-related types are more likely close to water bodies. There are also four regional species that are continent restricted: Tauros to the Americas, Mr Mime to Western Europe, Farfetch'd to Asia, and the marsupial like Kangaskhan to Australasia. This differentiation captures a fundamental aspect of natural history observation; that exploring new habitats and continents will lead to encounters with different species.

Varying abundance of Pokémon species also exposes players to species accumulation curves; playing Pokémon Go in central London will result in many more Pidgeys and Rattatas than Squirtles, just as it will result in many more observations of pigeons and rats than of turtles. The allure of rarity has been a driving motivation for generations of natural historians to spend long hours outside and explore remote areas, and this clearly applies to the search for unusual Pokémon as well. The news that hundreds of people recently congregated near New York's Central Park to try to find a rare Vaporeon (Worley 2016), for example, will sound familiar to birdwatchers used to similar congregations to see a rare species.

A number of conservation and nature organizations are already trying to make the most of Pokémon Go. A recent editorial in the journal Nature encouraged Pokémon Go players to make a contribution to real-world taxonomy by photographing and identifying real species during their Pokémon hunts ("Gotta name them all" 2016), and the U.S. Fish & Wildlife Service has produced a blog comparing Pokémon to the real species that occur at National Wildlife Refuges (Brigida 2016). It has even been calculated that if Pokémon Go players were identifying real instead of virtual animals, they could collect as much data in 6 days as has been collected in 400 years of natural history effort (August 2016). National Park Service Rangers at the National Mall are offering "Catch the Mall" Pokémon hunts; guided walks where rangers explain the important cultural sites the group pass while catching Pokémon (Zachos 2016). Similar ideas could easily be used in other parks and reserves with expert-led Pokémon tours where both Pokémon and real species are pointed out and discussed. Interactions such as this could leave a lasting legacy if people fall in love with outdoor experiences, become more aware of their local environment, or develop outdoor-orientated habits.

"Pokémon No": potential downsides of Pokémon for conservation

Various commentators have pointed out some of the less positive aspects of the Pokémon Go phenomenon. These include concerns about the game being played in inappropriate ways, such as while driving a car, or places, such as at the Fukushima evacuation zones in Japan, or due to players not paying attention to their surroundings while playing and becoming lost in cave systems, stranded by tides, or being robbed as a result (Khomami 2016). Beyond these more general concerns, there are a number of ways in which Pokémon Go might have negative implications for conservation; here we highlight four notable examples.

First, by drawing players outside, Pokémon Go may create direct negative environmental impacts, such as erosion caused by gamers' footfall. This could be particularly damaging if large numbers are drawn to search for rare Pokémon species in particularly sensitive habitats. However the urban bias within the game as it is currently designed suggests that this is unlikely.

Second, by promoting the idea of "catching" creatures that are subsequently used to fight against each other, the game may create or reinforce utilitarian and exploitative relations between human and nonhuman nature, rather than the message of respect preferred by conservationists.

It is not difficult to imagine Pokémon Go players trying to catch real animals and fight them against each other, inspired by the game. There have already been examples of real animals being "caught" in "Pokéballs" on social media (Desejosdehomem 2016).

Third, the brightly colored, exciting, and easily accessible Pokémon species may distract people from real species and the problems they face (Sandbrook *et al.* 2015). Who cares about critically endangered tigers in a faraway land when there may be a Vaporeon in the nearby park? While there is clearly potential to link an interest in Pokémon to natural history, it should not be assumed that the one will automatically flow from the other. In the aforementioned Washington D.C., example, the director of the National Park Service was compelled to issue a warning to players stating that people need to be wary of stumbling into wildlife around them whilst focusing on their phone screens (Carlton 2016), suggesting that cognitive "engagement" with the real world and its wildlife was limited. Indeed, if it is the ostentatiously fictitious nature of Pokémon that explains their appeal to an audience seeking escape from the perceived mundanity of the nonvirtual world, it could be very challenging to inspire interest in real-world wildlife through the game.

Finally, it has been argued that conservation efforts to reconnect people with nature can have the opposite of the intended effect, because constructing the problem as one of dissociation with nature reinforces the idea that humans occupy a distinct category from nonhuman nature (Fletcher 2016b). On a related note, Schultz (2000) argues that direct experience of nature augments the sense of being part of nature and therefore caring about its conservation, whereas indirect learning (such as through visiting a zoo) fosters an egoistic attitude to nature which is less conducive to supporting conservation. In both cases, it is possible to imagine that experiencing "nature" on screen through playing Pokémon might undermine rather than augment positive and caring relations between people and real nonhuman wildlife.

What can conservation learn from Pokémon Go?

The spectacular success of Pokémon Go provides significant lessons for conservation. Importantly, it suggests that conservation is continuing to lag behind Pokémon in efforts to inspire interest in its portfolio of species, a situation first identified by Balmford *et al.* (2002). We see two possible explanations for this situation. First, Pokémon Go is extremely user-friendly, and has none of the barriers to entry present in many types of natural history observation. It requires commonly available equipment (smartphones are widely owned and the game is free to download), no special knowledge (gameplay is very simple and the app locates and identifies Pokémon), no specific location (a short walk in any town or village is likely to produce interesting Pokémon), and rare "species" can be found in easily accessible and densely populated areas. By comparison real-world natural history activities such as birdwatching require specialist equipment (binoculars and field guides at a minimum), knowledge, and skills, access to certain habitats and locations, and a willingness to travel out of towns and cities for increased chances of seeing rare species. Studying taxonomic groups such as insects, plants and mammals often present steeper challenges. Finding ways to break down these barriers to engagement with real-world biodiversity is a priority for conservation.

Second, the Pokémon creatures encountered are not only species but also characters with specific story lines and histories from the Pokémon universe. Modern natural history study, in contrast, tends to frame itself entirely in scientific terms, avoiding anthropomorphizing its subjects. This overemphasis on a scientific framing may miss important opportunities for engagement based on affective relations with nonhuman nature (Lorimer 2015). Publicity surrounding the death of Cecil the lion, for example, highlights how easily individual animals can become anthropomorphized and the wealth of public interest that they often capture when this happens.

Conservation could potentially use digital games to address both of these issues, although with the risks and caveats outlined above. Most directly, there is clear potential to modify Pokémon Go itself to increase conservation content and impact above and beyond simply bringing gamers into closer physical proximity to nonhuman wildlife as a by-product of the game. Pokémon Go could be adapted to enhance conservation benefits by: (a) making Pokémon biology and ecology more realistic (e.g., stronger links between Pokémon species habitat requirements and real-world habitats to encourage learning about ecology); (b) adding real species to the Pokémon Go universe to expose those species to a huge number of users, and creating opportunities to raise awareness about them (e.g., the Zoological Society of London's endangered and unusual "EDGE" species); (c) deliberately placing Pokémon in more remote natural settings rather than urban areas to draw people to experience nonurban nature; or (d) adding a mechanism for users to catalogue real species, building on the popularity of the "Pokeblitz" concept (e.g., newly developed websites such as Pokemapper [www.pokemapper.co] and Poke Radar

[www.pokeradar.io] already map the "distributions" of different Pokémon in ways that are striking similar to citizen science projects such as eBird [www.ebird.org], and iNaturalist [www.inaturalist.org]).

Less directly, lessons from Pokémon Go could be applied to conservation through the development of new conservation-focused AR games. Following the model of Pokémon Go, games that encourage users to look for real species could provide a powerful tool for education and engagement. AR could also be used in zoos and protected areas to provide visitors with information about species and their habitats. It has been argued that such virtual engagement with conservation issues through games can have a greater affective influence on gamers than first-hand experience not mediated through screens (Fletcher 2016a). Though these ideas are potentially promising, it is important to note that Pokémon Go is specifically designed to be entertaining and builds off a well-established brand and nostalgia of people who grew up with the Pokémon franchise, benefits that would likely not be applicable to a conservation-focused app. Given the cost and difficulty of developing new games from scratch, seeking to modify a successful, existing product such as Pokémon Go may be the best way for conservation to benefit from AR games (Sandbrook *et al.* 2015).

Conclusion

Pokémon Go demonstrates that cleverly implemented AR games can reach millions of people and trigger substantial levels of behavioral change. In its basic features, the game has strong parallels to natural history observation and encourages outdoor recreation, both of which can help to establish interest in conservation and build conservation ethics (Kellert 1985; McFarlane & Boxall 1996) but are widely viewed as declining (Pergams & Zaradic 2006; Tewksbury *et al.* 2014). Though there are potential pitfalls that must be carefully considered, we see this game as an exciting opportunity to build interest in natural history observation and learning. There are ways to do this within the framework of Pokémon Go itself, through the development of related AR games, or by simply taking some of the lessons of Pokémon Go's appeal and applying them to natural history education in general.

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References

Allan, R. (2016). Pokémon GO is now the biggest mobile game in U.S. history. Available from https://www.surveymonkey.com/business/intelligence/pokemon-go-biggest-mobile-game-ever/. Accessed 31 July 2016

Allison, A. (2003). Portable monsters and commodity cuteness: Pokémon as Japan's new global power. *Postcol. Stud.*, **6**, 381-395.

Armanet, J. (2016). Could Pokémon Go improve people's health? Available from https://www.theguardian.com/healthcare-network/2016/jul/27/pokemon-go-improve-health-walking. Accessed 31 July 2016

August, T. (2016). Pokémon-Go players could capture 400 years of wildlife sightings in 6 days. Available from http://www.ceh.ac.uk/news-and-media/blogs/pok%C3%A9mon-go-players-could-capture-400-years-wildlife-sightings-6-days. Accessed 6 August 2016

Balmford, A., Clegg, L., Coulson, T., Taylor, J. & Street, D. (2002). Why conservationists should heed Pokémon. *Science*, **295**, 2367

Balmford, A. & Cowling, R.M. (2006). Fusion or failure? The future of conservation biology. *Conserv. Biol.*, **20**, 692-695.

BBC. (2016). Should you believe those Pokémon Go download numbers? Available from http://www.bbc.co.uk/news/magazine-36868076. Accessed 31 July 2016

Bogle, A. (2016). The story behind "Pokémon Go"s' impressive mapping. Available from http://mashable.com/2016/07/10/john-hanke-pokemon-go/#qIS7o8y1CmqN. Accessed 31 July 2016

Brigida, D. (2016). The Pokémon around us. Available from https://www.fws.gov/news/blog/index.cfm/2016/7/14/The-Pokemon-Around-Us. Accessed 1 August 2016

Brulliard, K. (2016). If you must play Pokémon Go, "catch" some real animals while you're at it. Available from https://www.washingtonpost.com/news/animalia/wp/2016/07/13/if-you-must-play-pokemon-go-catch-some-real-animals-while-youre-at-it/?tid=a_inl. Accessed 1 August 2016

Butcher, A. (2016). Pokémon Go see the world in its splendor. Available from http://www.nytimes.com/2016/07/17/opinion/sunday/pokemon-go-see-the-world-in-its-splendor.html. Accessed 31 July 2016

Carlton, J. (2016). "Pokémon Go" gives boost to national parks. Available from http://www.wsj.com/articles/pokemon-go-gives-boost-to-national-parks-1468447301. Accessed 1 August 2016

Desejosdehomem. (2016). Pokémon da vida real. Available from https://www.instagram.com/p/BI8aH1ig2I8/. Accessed 12 August 2016

Fletcher, R. (2016a). Gaming conservation: Nature 2.0 confronts nature-deficit disorder. *Geoforum*, doi:10.1016/j.geoforum.2016.02.009

Fletcher, R. (2016b). Connection with nature is an oxymoron: a political ecology of "nature-deficit disorder." *J. Environ. Educ.*, **0**, 1-8.

Gotta name them all: how Pokémon can transform taxonomy. (2016). Available from http://www.nature.com/news/gotta-name-them-all-how-pok%C3%A9mon-can-transform-taxonomy-1.20275. Accessed 1 August 2016

Kellert, S.R. (1985). Birdwatching in American society. *Leisure Sci.*, **7**, 343-360.

Khomami, N. (2016). Pokémon Go: London players robbed of phones at gunpoint. Available from https://www.theguardian.com/uk-news/2016/jul/30/three-pokemon-go-players-robbed-of-phones-at-gunpoint-in-london. Accessed 1 August 2016

Lorimer, J. (2015). *Wildlife in the Anthropocene*. University of Minnesota Press, Minnesota.

Louv, R. (2005). *Last child in the wood*. Algonquin Books, New York, NY, USA.

McFarlane, B.L. & Boxall, P.C. (1996). Participation in wildlife conservation by birdwatchers. *Human Dimen. Wildl.*, **1**, 1–14.

Nelson, R. (2016). Mobile users are spending more time in Pokémon Go than Facebook. Available from https://sensortower.com/blog/pokemon-go-usage-data. Accessed 31 July 2016

Pergams, O.R.W. & Zaradic, P.A. (2006). Is love of nature in the US becoming love of electronic media? 16-year downtrend in national park visits explained by watching movies, playing video games, internet use, and oil prices. *J. Environ. Manage.*, **80**, 387-393.

Sandbrook, C., Adams, W.M. & Monteferri, B. (2015). Digital games and biodiversity conservation. *Conserv. Lett.*, **8**, 118-124.

Schultz, P.W. (2000). Empathizing with nature: the effects of perspective taking on concern for environmental issues. *J. Soc. Issues*, **56**, 391-406.

Streitfeld, D. (2016). Chasing Pokémon, a baby step toward virtual reality. Available from http://www.nytimes.com/2016/07/22/technology/personaltech/chasing-pokemon-a-baby-step-toward-virtual-reality.html. Accessed 1 August 2016

Tancoigne, E. & Dubois, A. (2013). Taxonomy: no decline, but inertia. *Cladistics*, **29**, 567-570.

Tewksbury, J.J., Anderson, J.G.T., Bakker, J.D., *et al.* (2014). Natural history's place in science and society. *Bioscience*, **64**, 300-310.

Worley, W. (2016). Pokémon Go: video shows moment rare Vaporeon appears in Central Park and all hell breaks loose. Available from http://www.independent.co.uk/news/world/americas/pokemon-go-video-central-park-vaporeon-rare-running-new-york-a7140801.html. Accessed 1 August 2016

Zachos, E. (2016). Can Pokémon Go get players into national parks? Available from http://news.nationalgeographic.com/2016/07/pokemon-go-national-parks-level-up/. Accessed 1 August 2016

